Nonlinear Analysis

Theory, Methods & Applications

ol.
5
981

INDEX TO VOLUME 5, 1981

Pergamon Press Oxford · New York · Frankfurt

NONLINEAR ANALYSIS
THEORY, METHODS & APPLICATIONS

Editor: Prof. V. Lakshmikantham, Department of Mathematics, University of Texas at Arlington, Arlington, Texas 76019, USA
Editorial Secretary: Ms. M. Pruiett

Honorary Editorial Board

R. Bellman, *University of Southern California, Los Angeles, CA, USA*
L. Cesari, *University of Michigan, Ann Arbor, MI, USA*
E. A. Coddington, *University of California, Los Angeles, CA, USA*
P. Hartman, *Johns Hopkins University, Baltimore, MD, USA*
D. A. Kendall, *Cambridge University, Cambridge, England*
J. P. LaSalle, *Brown University, Providence, RI, USA*
J. L. Lions, *College de France, Paris 1e, France*
P. A. Samuelson, *Massachusetts Institute of Technology, Cambridge, MA, USA*

Associate Editorial Board

H. A. Antosiewicz, *University of Southern California, Los Angeles, CA, USA*
R. Aris, *University of Minnesota, Minneapolis, MN, USA*
T. B. Benjamin, *Mathematical Institute, 24–29 St. Giles, Oxford, England*
A. Bensoussan, *IRIA, Le Chesney, France*
A. T. Bharucha-Reid, *Wayne State University, Detroit, MI, USA*
H. Brezis, *4 Place Jussieu, Paris, France*
R. Brockett, *Harvard University, Cambridge, MA, USA*
F. Browder, *University of Chicago, Chicago, IL, USA*
J. Chandra, *Army Research Office, Durham, NC, USA*
R. Conti, *Via G. B. Amici 14/A 50134, Firenze, Italy*
C. Corduneanu, *Department of Mathematics, University of Texas at Arlington, TX 76019, USA*
M. G. Crandall, *University of Wisconsin, Madison, WI, USA*
Jane Cronin, *Rutgers University, New Brunswick, NJ, USA*
A. Friedman, *Northwestern University, Evanston, IL, USA*
R. P. Gilbert, *University of Delaware, Newark, DE, USA*
A. Halanay, *Bucharest University, R–70109 Bucuresti, Rumania*
J. K. Hale, *Brown University, Providence, RI, USA*
T. G. Hallam, *University of Tennessee, Knoxville, TN 37916, USA*
W. A. Harris, Jr., *University of Southern California, Los Angeles, CA, USA*
L. K. Jackson, *University of Nebraska, Lincoln, NB, USA*
R. Kalaba, *University of Southern California, Los Angeles, CA, USA*
R. E. Kalman, *University of Florida, Gainesville, FL, USA, and ETH, Zurich, Switzerland*
F. Kappel, *Universität Graz, Graz, Austria*
M. A. Krasnoselskii, *Institute of Control Sciences, Moscow, USSR*
S. Leela, *State University of New York at Geneseo, NY, USA*
R. H. Martin, Jr., *North Carolina State University, Raleigh, NC 27607, USA*
J. Mawhin, *Université Catholique de Louvain, Belgium*
R. May, *Princeton University, Princeton, NJ, USA*
J. B. McLeod, *Wadham College, Oxford, England*
E. Montroll, *University of Rochester, Rochester, NY 10021, USA*
A. Myshkis, *Altufevscoy Shosse, Moscow, USSR*
Z. Nashed, *University of Delaware, Newark, DE, USA*
L. Nirenberg, *New York University-Courant, New York, NY, USA*
J. A. Nohel, *University of Wisconsin, Madison, WI 53706, USA*
T. Oden, *University of Texas at Austin, Austin, TX 78712, USA*
M. N. Oğuztöreli, *University of Alberta, Edmonton, Alberta, Canada*
C. Olech, *Instytut Matematyczny PAN, Warszawa, Poland*
L. Salvadori, *Dipertimento di Matematica, Universitate di Trento, 38050-Trento, Italy*
M. Scott, *Sandia Corporation, Albuquerque, NM, USA*
C. P. Tsokos, *University of Southern Florida, Tampa, FL, USA*
W. Walter, *Universität Karlsruhe, 75 Karlsruhe, West Germany*

Publishing and Advertising Offices

Pergamon Press Ltd., Headington Hill Hall, Oxford OX3 0BW (Oxford 64881; Telex 83177).

Subscription Rates (1982)

For libraries, university departments, government laboratories, industrial and other multiple-reader institutions: US $200.00 per annum. Two-year rate, (1982–83): $380.00 (including postage and insurance). Subscription enquiries from customers in North America should be sent to: Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford, NY 10523, USA, and for the remainder of the world to: Pergamon Press Ltd., Headington Hill Hall, Oxford OX3 0BW, UK.

Specially Reduced Rates for Individuals. In the interests of maximizing the dissemination of the research results published in this important international journal, we have established a two-tier price structure. Any individual, whose institution takes out a library subscription, may purchase a second or additional subscriptions for *personal* use at the much reduced rate of US $55.00 per annum.

Microform Subscriptions and Back Issues: Back issues of all previously published volumes are available in the regular editions and on microfilm and microfiche. Current subscriptions are available on microfiche simultaneously with the paper edition and on microfilm on completion of the annual index at the end of the subscription year.

Published Monthly Copyright © 1982 Pergamon Press Ltd.

It is a condition of publication that manuscripts submitted to this journal have not been published and will not be simultaneously submitted or published elsewhere. By submitting a manuscript, the authors agree that the copyright for their article is transferred to the publishers if and when the article is accepted for publication. However, assignment of copyright is not required from authors who work for organisations which do not permit such assignment. The copyright covers the exclusive rights to reproduce and distribute the article, including reprints, photographic reproductions, microform or any other reproductions of similar nature and translations. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, electrostatic, magnetic tape, mechanical photocopying, recording or otherwise, without permission in writing from the copyright holder.

U.S. Copyright Law Applicable to Users in the U.S.A.

The Article Fee Code on the first page of an article in this journal indicates the copyright owner's consent that, in the U.S.A., copies may be made for personal or internal use provided the stated fee for copying, beyond that permitted by Section 107 or 108 of the United States Copyright Law, is paid. The appropriate remittance should be forwarded with a copy of the first page of the article to the Copyright Clearance Center Inc., 21 Congress Street, Salem, MA 01970. If a code does not appear copies of the article may be made without charge, provided permission is obtained from the publisher. The copyright owner's consent does not extend to copying for general distribution, for promotion, for creating new works or for resale. Specific written permission must be obtained from the publisher for such copying. In case of doubt please contact your nearest Pergamon office.

Vol
5
198

VOLUME CONTENTS

VOLUME 5 NUMBER 1

H. HOFER	1	A multiplicity result for a class of nonlinear problems with application to a nonlinear wave equation
B. LI	13	Uniqueness and stability of a limit cycle for a third order dynamical system arising in neuron modelling
W. WALTER	21	Remarks on a paper by F. Browder about contraction
R. JANIN and R. SENTIS	27	Existence of an optimal feedback control in a control problem
R. TORREJON	47	On the common fixed point of a commutative family of nonlinear mappings
Y. ITOH	53	Non-associative algebra and Lotka-Volterra equation with ternary interaction
J. V. A. GONÇALVES	57	On bounded nonlinear perturbations of an elliptic equation at resonance
G. MOROŞANU	61	Stability of solutions of nonlinear boundary-value problems for hyperbolic systems
N. KENMOCHI	71	On the quasi-linear heat equation with time-dependent obstacles
S. KATO	81	Some remarks on nonlinear ordinary differential equations in a Banach space
J. L. VAZQUEZ	95	An *a priori* interior estimate for the solutions of a non-linear problem representing weak diffusion
A. L. EDELSON	105	Conjugate and focal points of nonlinear equations
F. E. BROWDER	111	Erratum to the paper "Remarks on fixed point theorems of contractive type"

VOLUME 5 NUMBER 2

SHIH-SEN CHANG	113	Random fixed point theorem in probabilistic analysis
K. KUNISCH and W. SCHAPPACHER	123	Variation of constants formulas for partial differential equations with delay
H. ATTOUCH	143	On the maximality of the sum of two maximal monotone operators
J. F. COLOMBEAU and J. MUJICA	149	Existence of holomorphic mappings with prescribed asymptotic expansions at a given set of points in infinite dimensions
S. SHAHSHAHANI	157	Periodic solutions of polynomial first order differential equations

Vol. 5 1981

B. JAKUBCZYK and B. KAŚKOSZ	167	Realizability of Volterra series with constant kernels
P. SMITH	185	Extended dual extremum principles for nonlinear problems
E. THOULOUZE-PRATT	195	Existence theorem of an invariant torus of solutions to a periodic differential system
G. F. WEBB and M. BADII	203	Nonlinear nonautonomous functional differential equations in L^p spaces

VOLUME 5 NUMBER 3

L. VERON	225	Singular solutions of some nonlinear elliptic equations
S. INVERNIZZI	243	Surjectivity of perturbations of Fredholm mappings using semi-inner-products
D. FLOCKERZI	249	Bifurcation formulas for O.D.E.'s in $\mathbb{R}^n$
O. VEJVODA and I. STRASKRABA	265	Perturbed nonlinear abstract equations
H.-P. HEINZ	277	Theorems of Ascoli type involving measures of non compactness
G. EMMANUELE	287	Fixed point theorems in complete metric spaces
D. H. MARTIN	293	The spectra of bounded linear self-adjoint operators relative to a cone in Hilbert space
J. REEDER and M. SHINBROT	303	Three-dimensional, nonlinear wave interaction in water of constant depth
Y. G. SFICAS and S. K. NTOUYAS	325	A boundary value problem for n-th order functional differential equations

VOLUME 5 NUMBER 4

R. KALABA, K. SPINGARN and L. TESFATSION	337	Individual tracking of an eigenvalue and eigenvector of a parameterized matrix
V. BARBU and G. MOROSANU	341	Existence for a nonlinear hyperbolic system
I. I. VRABIE	355	Compactness methods for an abstract nonlinear Volterra integrodifferential equation
Z. VOREL	373	Continuous dependence on parameters
J.-L. MENALDI	381	A singular perturbation result for variational and quasi-variational inequalities
V. ALEXIADES	401	Almost periodic solutions of an integrodifferential system with infinite delay
M. ALTMAN	411	Quasi-linear evolution equations in non-reflexive Banach spaces, I
A. S. FOKAS and B. FUCHSSTEINER	423	Bäcklund transformations for hereditary symmetries
E. SHIMBORSKY	433	Variational inequalities arising in the theory of two dimensional potential flows
W. R. UTZ	445	The existence of solutions of a third order boundary value problem

Vol
5
198

Vol.
5
1981

VOLUME 5 NUMBER 5

N. H. PAVEL	449	Nonlinear evolution equations governed by F-quasi-dissipative operators
R. J. THOMPSON	469	Functional differential equations with unbounded delay in a Banach space
K. J. BROWN, M. M. A. IBRAHIM and R. SHIVAJI	475	*S*-shaped bifurcation curves
F. ROTHE	487	Global existence of branches of stationary solutions for a system of reaction diffusion equations from biology
N. TURBE	499	Averaging of a non-linear integrodifferential equation
J. SCHINAS and M. BOUDOURIDES	509	Higher order differentiability of multifunctions
M. WILLEM	517	Topology and semilinear equations at resonance in Hilbert space
E. ADAMS and W. F. AMES	525	On contracting interval iteration for nonlinear problems in R^n: Part II—applications
J. BAILLIEUL	543	Controllability and observability of polynomial dynamical systems
J. D. BUCKHOLTZ and S. M. SHAH	553	Analytic functions with constraints on coefficients
J. GWINNER	565	On fixed points and variational inequalities—a circular tour
W. V. PETRYSHYN	585	On the solvability of $x \in Tx + \lambda Fx$ in quasinormal cones with T and Fk-set-contractive

VOLUME 5 NUMBER 6

N. D. ALIKAKOS	593	Remarks on invariance in reaction–diffusion equations
J. B. BENNETT	615	Total stability for a Volterra integral equation
J. P. PENOT	625	A characterization of tangential regularity
B. A. FLEISHMAN	645	A step-function model in chemical reactor theory: multiplicity and stability of solutions
T. T. BOWMAN	655	Bifurcation of solutions of nonlinear boundary value problems
D. R. K. S. RAO, K. N. MURTHY and A. S. RAO	669	On three-point boundary value problems associated with third order differential equations
K. M. DAS, S. P. SINGH and B. WATSON	675	A note on Mann iteration for quasi-nonexpansive mappings
J. MAWHIN and J. R. WARD, JR.	677	Nonresonance and existence for nonlinear elliptic boundary value problems
J.-L. MENALDI	685	Existence and uniqueness for degenerate second order variational inequalities

VOLUME 5 NUMBER 7

G.-C. DONG and S. LI	705	A boundary value problem for nonlinear telegraph equation
S. B. AGASE	713	Existence and stability of ordinary differential equations in locally convex spaces
P. TOLKSDORF	721	On quasilinear boundary value problems in domains with corners
T. HAVÂRNEANU	737	Semigroups and differential equations with infinite delay
M. TURINICI	757	Differential inequalities via maximal element techniques
L. C. EVANS and S. LENHART	765	The parabolic Bellman equation
H.-O. WALTHER	775	Homoclinic solution and chaos in $x(t) = f(x(t-1))$
J.-B. BAILLON and P. CLEMENT	789	Ergodic theorems for non-linear Volterra equations in Hilbert space
J. SCHRÖDER	803	Shape-invariant bounds for ordinary differential operators and generalizations

Vol. 5 198

VOLUME 5 NUMBER 8

R. KALABA and L. TESFATSION	821	Complete comparative static differential equations
V. ALEXIADES and C. Y. CHAN	835	A singular Fourier problem with nonlinear radiation in a noncylindrical domain
M. FARKAS	845	Attractors of systems close to periodic ones
E. N. CHUKWU	853	Global asymptotic behaviour of functional differential equations of the neutral type
A. M. FINK	873	Wendroff's inequalities
J. NEDELMAN	875	On the equations of facilitated diffusion
J. R. L. WEBB	891	Existence theorems for sums of k-ball contractions and accretive operators via A-proper mappings
E. SCHECHTER	897	Existence and limits of Carathéodory–Martin evolutions

VOLUME 5 NUMBER 9

B. LI	931	Periodic orbits of autonomous ordinary differential equations: theory and applications
T. PRUSZKO	959	Topological degree methods in multi-valued boundary value problems
L. BOCCARDO and F. DONATI	975	Existence and stability results for solutions of some strongly nonlinear constrained problems
J. HENDERSON	989	Existence of solutions of right focal point boundary value problems for ordinary differential equations
J. HOFBAUER	1003	On the occurrence of limit cycles in the Volterra–Lotka equation

O. HADŽIĆ 1009 Some fixed point and almost fixed point theorems for multivalued mappings in topological vector spaces

Z. MEIKE 1021 Existence for an evolution equation with a nonmonotone continuous nonlinearity

G. CONTI and R. IANNACCI 1037 Using a nonlinear spectral theory to solve boundary value problems

VOLUME 5 NUMBER 10

A. SZULKIN 1043 Global structure of level sets of a class of nonlinear Fredholm mappings

R. M. BIANCHINI and P. ZECCA 1053 On the attainable set at time T for multivalued differential equations

K. BALAKRISHNA REDDY and P. V. SUBRAHMANYAM 1061 Altman's contractors and Matkowski's fixed point theorem

C. V. PAO 1077 Reaction diffusion equations with nonlinear boundary conditions

W. V. PETRYSHYN 1095 Variational solvability of quasilinear elliptic boundary value problems at resonance

R. E. GAINES and J. K. PETERSON 1109 Periodic solutions to differential inclusions

K. L. COOKE, J. L. KAPLAN and M. SORG 1133 Stability of a functional differential equation for the motion of a radiating charged particle

B. KAWOHL 1141 On nonlinear parabolic equations with abruptly changing nonlinear boundary conditions

VOLUME 5 NUMBER 11

M. CRISTEA 1155 A note on global inversion theorems and applications to differential equations

T. J. WALTERS and G. E. PARKER 1163 Positive nonlinear integral equations with reciprocals of the solution in the integrand

A. R. AFTABIZADEH and V. LAKSHMIKANTHAM 1173 On the theory of terminal value problems for ordinary differential equations

A. LASOTA 1181 Stable and chaotic solutions of a first order partial differential equation

M. N. OĞUZTÖRELİ, V. LAKSHMIKANTHAM and S. LEELA 1195 An algorithm for the construction of Liapunov functions

V. BARBU and G. DA PRATO 1213 Existence and approximation for stationary Hamilton Jacobi equations

H. ENGLER 1225 Invariant sets for functional differential equations in Banach spaces and applications

P. L. LIONS 1245 Some remarks on Hartree equation

L. J. LIPKIN 1257 Weak continuity and compactness of nonlinear mappings

Vol. 5 1981

VOLUME 5 NUMBER 12

R. S. KUBRUSLY and J. T. ODEN	1265	Nonlinear eigenvalue problems characterized by variational inequalities with applications to the postbuckling analysis of unilaterally-supported plates
R. D. NUSSBAUM and N. BAXTER	1285	A nonlinear integral equation
R. REDHEFFER and Z. ZHIMING	1309	Global asymptotic stability for a class of many-variable Volterra prey–predator systems
A. JEFFREY and T. KAWAHARA	1331	A note on the multiple scale Fourier transform
J. WIMP	1341	Accelerating convergence by root finding
G. HADDAD	1349	Topological properties of the sets of solutions for functional differential inclusions
D. J. DOWNING and W. O. RAY	1367	Some remarks on set-valued mappings
R. ESTRADA and R. P. KANWAL	1379	Applications of generalized functions in economics
N. H. PAVEL	1389	Addendum—Nonlinear evolution equations governed by *F*-quasi-dissipative operators

Vol.
5
198

AUTHOR INDEX

Adams, E. 525
Aftabizadeh, A. R. 1173
Agase, S. B. 713
Alexiades, V. 401, 835
Alikakos, N. D. 593
Altman, M. 411
Ames, W. F. 525
Attouch, H. 143

Badii, M. 203
Baillieul, J. 543
Baillon, J.-B. 789
Balakrishna Reddy, K. 1061
Barbu, V. 341, 1213
Baxter, N. 1285
Bennett, J. B. 615
Bianchini, R. M. 1053
Boccardo, L. 975
Boudourides, M. 509
Bowman, T. T. 655
Browder, F. E. 111
Brown, K. J. 475
Buckholtz, J. D. 553

Chan, C. Y. 835
Chukwu, E. N. 853
Clement, P. 789
Colombeau, J. F. 149
Conti, G. 1037
Cooke, K. L. 1133
Cristea, M. 1155

Da Prato, G. 1213
Das, K. M. 675
Donati, F. 975
Dong, G.-C. 705
Downing, D. J. 1367

Edelson, A. L. 105
Emmanuele, G. 287
Engler, H. 1225
Estrada, R. 1379
Evans, L. C. 765

Farkas, M. 845
Fink, A. M. 873
Fleishman, B. A. 645
Flockerzi, D. 249
Fokas, A. S. 423
Fuchssteiner, B. 433

Gaines, R. E. 1109
Gonçalves, J. V. A. 57
Gwinner, J. 565

Haddad, G. 1349
Hadžic, O. 1009
Havârneanu, T. 737
Heinz, H.-P. 277
Henderson, J. 989
Hofbauer, J. 1003
Hofer, H. 1

Iannacci, R. 1037
Ibrahim, M. M. A. 475
Invernizzi, S. 243
Itoh, Y. 53

Jakubczyk, B. 167
Janin, R. 27
Jeffrey, A. 1331

Kalaba, R. 337, 821
Kanwal, R. P. 1379
Kaplan, J. L. 1133
Kaśkosz, B. 167
Kato, S. 81
Kawahara, T. 1331
Kawohl, B. 1141
Kenmochi, N. 71
Kubrusly, R. S. 1265
Kunisch, K. 123

Lakshmikantham, V. 1173, 1195
Lasota, A. 1181
Leela, S. 1195
Lenhart, S. 765
Li, B. 13, 931
Li, S. 705
Lions, P. L. 1245
Lipkin, L. J. 1257

Mahar, T. J. 645
Martin, D. H. 293
Mawhin, J. 677
Meike, Z. 1021
Menaldi, J.-L. 381, 685
Moroşanu, G. 61, 341
Mujica, J. 149
Murthy, K. N. 669

Nedelman, J. 875
Ntouyas, S. K. 325
Nussbaum, R. D. 1285

Oğuztöreli, M. N. 1195
Oden, J. T. 1265

Pao, C. V. 1077
Parker, G. E. 1163
Pavel, N. H. 449, 1389
Penot, J. P. 625
Peterson, J. K. 1109
Petryshyn, W. V. 585, 1095
Pruszko, T. 959

Rao, A. S. 669
Rao, D. R. K. S. 669
Ray, W. O. 1367
Redheffer, R. 1309
Reeder, J. 303
Rothe, F. 487

Schappacher, W. 123
Schechter, E. 897
Schinas, J. 509
Schröder, J. 803
Sentis, R. 27
Sficas, Y. G. 325
Shah, S. M. 553
Shahshahani, S. 157
Shih-Sen Chang, 113
Shimborsky, E. 433
Shinbrot, M. 303
Shivaji, R. 475
Singh, S. P. 675
Smith, P. 185
Sorg, M. 1133
Spingarn, K. 337
Straškraba, I. 265
Subrahmanyam, P. V. 1061
Szulkin, A. 1043

Tesfatsion, L. 337, 821
Thompson, R. J. 469
Thoulouze-Pratt, E. 195
Tolksdorf, P. 721
Torrejón, R. 47
Turbe, N. 499
Turinici, M. 757

Utz, W. R. 445

Vazquez, J. L. 95
Vejvoda, O. 265
Veron, L. 225
Vorel, Z. 373
Vrabie, I. I. 355

Walter, W. 21
Walters, T. J. 1163
Walther, H.-O. 775
Ward, J. R. Jr., 677
Watson, B. 675
Webb, G. F. 203
Webb, J. R. L. 891
Willem, M. 517
Wimp, J. 1341

Zecca, P. 1053
Zhiming, Z. 1309

Vol. 5 1981